Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended)
Claim 2 (currently amended)
Claim 3 (currently amended)
Claim 4 (currently amended)
Claim 5 (original)
Claim 6 (original)
Claim 7 (original)
Claim 8 (currently amended)
Claim 9 (original)
Claim 10 (original)
Claim 11 (original)
Claim 12 (original)

Claim 1

1. A system for supplying ~~extra low voltage~~ electrical energy for at least one electrical traction vehicle (30) running on a track (20) and comprising:

- wheels (31) linked to said vehicle and rolling on said track (20), and

- at least one traction chain (70) of said vehicle acting on the wheels (31) and comprising, in a manner know per se, at least one electric motor and its control,

- at least one ~~extra low voltage~~ power supply means (10) installed in the ~~immediate~~ vicinity of the track (20),

~~- two power supply rails (41, 42) or similar power supply elements, parallel to each other, adjacent or distant, of which a first (41)) is linked to a terminal (11) of said power supply means (10) and the~~

~~second (42) is linked to another terminal (12) of said power supply means (10),~~

- at least one ~~first~~ electrical energy collection means (51,52) on board the vehicle~~ and placed in moving contact with said first rail (41)~~,

~~- at least one second electrical energy collection means (52) also on board the vehicle and placed in moving contact with the said second rail (42)~~,

- at least one electrical energy storage means (60) on board the vehicle,

System characterized in that it comprises at least one onboard power supply means (80) which is linked to said electrical energy collection means (51, 52), and which is connected on the one hand to said storage means (60) and on the other hand to said traction chain (70), and which controls the energy distribution from the storage means (60) to the traction chain (70) and in particular the recharging of the storage means (60) and its selective discharging to feed the traction chain (70) according to the energy demand and the rolling sequences of the vehicle

and in that

- the power of the supply means (10) installed in the vicinity of the track (20) is significantly lower than the nominal power of the traction chain (70) of said vehicle (30).

Claim 2

2. The system as claimed in claim 1, characterized in that said ~~extra low voltage~~ power supply means (10) feeds said onboard power supply means (80), the latter in turn feeding said storage means (60) so that it stores electrical energy, to its full capacity, in the following successive phases:

a) during the phases of coasting on the flat when the power demanded by the traction chain (70) is modest, or even zero,

b) during the braking phase when there is also a recovery of electrical energy from the traction chain (70),

c) and during the stopping phase when the power demanded by the traction chain (70) is zero,

said on board power supply means (80) using, in addition to the energy taken from the ~~extra low voltage~~ supply means (10), the electrical energy that has been stored in said phases (a, b, c) in said storage means (60) to power the traction chain (70) during the starting phase or a gradient to be climbed, when the power demanded by the traction chain is relatively high~~, or when coasting without extra low voltage supply, and the energy from the extra low voltage supply means (10) in the other phases of motion~~.

Claim 3

3. The system as claimed in claim 1 or 2, characterized in that said ~~extra low voltage~~ supply means (10) comprises a number of ~~extra low voltage~~ supply means (10n, 10n+1, etc.) installed along the track (20), either between the rails, or in the immediate vicinity, independent or interlinked.

Claim 4

4. The system as claimed in either of the preceding claims, characterized in that the voltage delivered by the power supply means (10) is <u>an extra low voltage power supply</u> 48 volts DC~~, one of the power supply rails (41) being at +24V and the other (42) at -24V~~.

Claim 5 (original)

Claim 6 (original)

Claim 7 (original)

Claim 8

8. The system as claimed in claim 7, characterized in that the main computer (85) determines, by periodic measurement, the position x of the vehicle (30) to compute the distance between the vehicle (30) and the nearest power supply means (10) and, based on this information, the computer (85) controls the first converter (81) to optimize the current pick-up, for example, by reducing its intensity if it is remote from the ~~extra-low-voltage~~ supply means (10) and by increasing it when the vehicle approaches a next ~~extra-low-voltage~~ supply means so as to limit the line losses by Joule effect.

Claim 9 (original)

Claim 10 (original)

Claim 11 (original)

Claim 12 (original)

Amended Claims:

1. A system for supplying electrical energy for at least one electrical traction vehicle (30) running on a track (20) and comprising:

- wheels (31) linked to said vehicle and rolling on said track (20), and
- at least one traction chain (70) of said vehicle acting on the wheels (31) and comprising, in a manner know per se, at least one electric motor and its control,
- at least one power supply means (10) installed in the vicinity of the track (20),
- at least one electrical energy collection means (51,52) on board the vehicle,
- at least one electrical energy storage means (60) on board the vehicle,

System characterized in that it comprises at least one onboard power supply means (80) which is linked to said electrical energy collection means (51, 52), and which is connected on the one hand to said storage means (60) and on the other hand to said traction chain (70), and which controls the energy distribution from the storage means (60) to the traction chain (70) and in particular the recharging of the storage means (60) and its selective discharging to feed the traction chain (70) according to the energy demand and the rolling sequences of the vehicle

and in that

- the power of the supply means (10) installed in the vicinity of the track (20) is significantly lower than the nominal power of the traction chain (70) of said vehicle (30).

2. The system as claimed in claim 1, characterized in that said power supply means (10) feeds said onboard power supply means (80), the latter in turn feeding said storage means (60) so that it stores electrical energy, to its full capacity, in the following successive phases:

a) during the phases of coasting on the flat when the power demanded by the traction chain (70) is modest, or even zero,

b) during the braking phase when there is also a recovery of electrical energy from the traction chain (70),

c)and during the stopping phase when the power demanded by the traction chain (70) is zero,

said on board power supply means (80) using, in addition to the energy taken from the supply means (10), the electrical energy that has been stored in said phases (a, b, c) in said storage means (60) to power the traction chain (70) during the starting phase or a gradient to be climbed, when the power demanded by the traction chain is relatively high.

3. The system as claimed in claim 1 or 2, characterized in that said supply means (10) comprises a number of supply means (10n, 10n+1, etc.) installed along the track (20), either between the rails, or in the immediate vicinity, independent or interlinked.

4. The system as claimed in either of the preceding claims, characterized in that the voltage delivered by the power supply means (10) is an extra low voltage power supply 48 volts DC.

5. The system as claimed in any one of the preceding claims, characterized in that said storage means (60) comprises hypercapacitors (61) possibly combined with batteries (62), or batteries and is dimensioned so as to cover the greatest energy demand of the traction chain (70), namely a starting of the vehicle followed by a gradient to be climbed, and, possibly, rolling in partial autonomy mode.

6. The system as claimed in one of the preceding claims, characterized in that the onboard power supply means (80) comprises at least one computer device (85) controlling the energy distribution from the storage means (60) to the traction chain (70), and in particular the recharging of the hypercapacitors (61), their selective discharging to feed the traction chain (70) according to the energy demand, the rolling sequences and the line losses, and the recovery of braking energy from the vehicle by the storage means (60) from the motor of the traction chain (70) switched to generator mode.

7. The system as claimed in claim 6, characterized in that the onboard power supply means (80) comprises:

- a first DC/DC electrical voltage converter (81) for raising the 48V DC extra low voltage of 400V DC, on a common supply bus (82);
- a second DC/DC reversible electrical voltage converter (84) suited to the supercapacitors (61) working in the 400V to 800V range and delivering the power supply from the supercapacitors (61) to the bus (82) and recharging it from the bus (82) depending on the operating phases;

- a main energy management computer (85) managing the running, speed, braking and stopping operation of the vehicle (30), the main computer (85) being linked to secondary computers, respectively, a computer for the supercapacitors(61), a computer for the batteries (62), a computer for the traction chain (70), a computer for the pick-up device (51, 52, 53), these computers being more specifically assigned to the dedicated management of the elements to which they are linked;

- a safety discharging device for switching the on board power supply means to a safe mode for maintenance operations, and,

- a battery charger device directly fed by the pick-up device (51, 52, 53) and selectively recharging the batteries (62) according to the control from the batteries computer.

8. The system as claimed in claim 7, characterized in that the main computer (85) determines, by periodic measurement, the position x of the vehicle (30) to compute the distance between the vehicle (30) and the nearest power supply means (10) and, based on this information, the computer (85) controls the first converter (81) to optimize the current pick-up, for example, by reducing its intensity if it is remote from the supply means (10) and by increasing it when the vehicle approaches a next supply means so as to limit the line losses by Joule effect.

9. The system as claimed in any one of the preceding claims, characterized in that said vehicle (30) is a rail vehicle running on a rail track (20), the rolling rails of which (21, 22) can be combined, at least one, with the

power supply rails (41, 42), or are separate from the latter.

10. The system as claimed in any one of the claims 1 to 8, characterized in that said vehicle is a vehicle with pneumatic tires (30′, 30′′).

11. The system as claimed in claim 10, characterized in that said electrical energy collection means (51′,52′; 51′′,52′′) are disposed under the vehicle (30′, 30′′) being transversely mobile to accompany the vehicle (30′, 30′′) on the track (20′, 20′′), and can be retracted over an obstacle or out of the power supply rails (41′, 42′; 41′′, 42′′).

12. The system as claimed in claim 10, characterized in that the track (20′, 20′′) comprises a vehicle guide rail (30′, 30′′).